

# SUMMARY OF RESPONSES TO NPRM DGTA 01-08

## AAP7001.054 SECTION 2 CHAPTER 22

### ELECTRONIC FLIGHT BAGS

#### INTRODUCTION

##### General

1. This Summary of Responses (SR) details DGTA's responses and intended actions to the comments received for NPRM DGTA 01-08 and finalises the consultation process. Any person having views or arguments to support an appeal against the decisions documented in this SR may petition DGTA to consider such an appeal.

##### Background

2. On 15 May 08, DGTA released NPRM 01-08 Electronic Flight Bags (EFB) for comment. The period for comment on the proposals contained in this NPRM closed on 30 Jun 08.

3. There were 5 responses to the NPRM, providing representation from both technical and operational stakeholders. A list of respondents who have consented to their names being published is attached at annex A.

4. Following the receipt of comments, the proposed chapter on Electronic Flight Bags has been subject to minor amendment. This SR discusses respondent comments and provides a DGTA response and disposition. Para references through this response refer to proposed EFB chapter as issued with NPRM 01-08.

#### ANALYSIS OF COMMENTS

##### General

5. The disposition of Comments is shown in Figure 1.

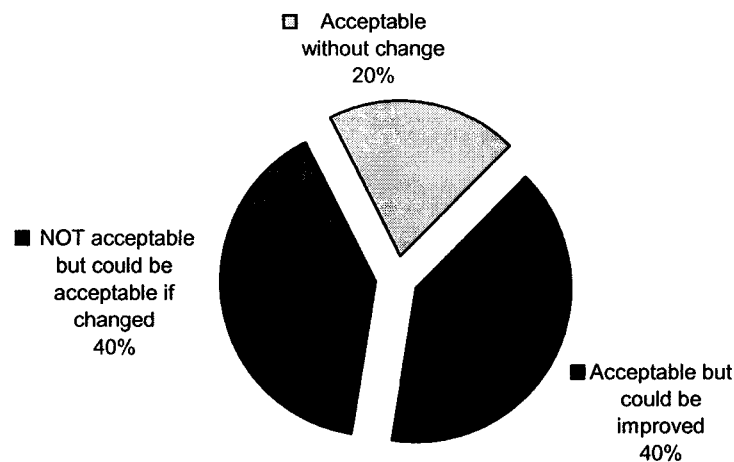


Figure 1

## RECEIVED COMMENTS

### Comment 1 – Flexibility for OAA to Accept Systems Based on Risk

6. The comment received is as follows:

*The Type B criteria for Electronic Flight Bags (EFB), as stated in the draft, are too restrictive, and would require exemptions for all commercially available potential hardware solutions currently available, including those used now in the US. Technical aspects of this issue comprise only about one - third : the other two-thirds are operational, based on cockpit resource management and human factors. The draft should allow sufficient flexibility for an operational airworthiness authority to accept systems based on assessed risk.*

### Response

7. Of the recognised civilian and military airworthiness authorities, DGTA has assessed that the FAA has the most mature and available policy and guidance on the certification of EFBs (para 9). Furthermore their policy has been shaped by the findings of several National Transportation Safety Board (NTSB) accident investigations. DGTA has assessed that the current US DoD basis for approval is not representative of the requirements of a contemporary airworthiness authority. This is because the US DoD has either retained risk associated with a capability/safety tradeoff internally of which we have not had visibility, or the US DoD has adopted a position with which DGTA does not agree with. Therefore, US DoD acceptance of software applications on EFBs should not on its own be considered a valid basis for ADF design acceptance. For these reasons, the ADF approach to EFB approvals has been derived from the FAA approach. This approach is commensurate with numerous other national airworthiness authorities including CASA and EASA.

8. A recent HQAC funded RPDE Quicklook QL027 – Electronic Flight Bags for ADF Aircraft of 14 Apr 08 confirmed that there are commercially available hardware and software solutions that would meet the requirements of the proposed chapter. EFBs are commonly used in civil aviation, and each of these would meet relevant parts of the proposed chapter, where the use is the same as the civil sector. Therefore the comment's assertion that exemptions would be required for all commercially available hardware solutions is unfounded.

9. The proposed chapter recognises that operational issues are a significant factor in the approval of EFBs. In the absence of guidance on EFBs in the AAP 8000.010, the proposed chapter provides suggestions on operational considerations (para's 36-38). Furthermore, a process has been defined for managing deficiencies against the requirements recommended by the chapter (paras 42, 43). This provides the Operational Airworthiness Authority the flexibility to use systems where the improvement in operational safety or capability is assessed to be worth retaining the residual risk.

### Disposition

10. The proposed AAP7001.054 chapter on Electronic Flight Bags does not require amendment to address these comments.

**Comment 2 – Windows OS and PFPS as a Moving Map**

11. The comments received are as follows:

*The lack of flexibility (referenced in Comment 1) arises from an effective exclusion of the Windows operating system in favour of aviation specific operating systems. The two critical functions which any EFB must be able to support are the Portable Flight Planning System (PFPS) — the ADF's accepted common mission planning system — and a moving map display which can fuse tactical data such as Blue Force Tracking. Whilst aviation specific operating systems such as Green Hills and Lynx OS can perform the latter, they are not immediately compatible with PFPS and would incur considerable additional management burden and cost.*

*The ADF is already using a Windows based system for a tailored EFB in Chinook aircraft in operations in the Middle-East where PFPS and moving map display are mandatory. This system has been accepted into service by the US DoD.*

**Response**

12. The Windows Operating System (OS) is not excluded for use and can be used to host Type A and B applications. Para 11a describes Portable EFB as generally consisting of COTS-based computing systems, which would include a COTS OS such as Windows, and the applications listed in paras 14 and 15 are predominantly Windows applications. In some cases it may even be possible to host Type C applications on a Windows OS provided the considerations in paras 17-18 and 28-29 are addressed. Therefore the comments' assertion that the Windows OS is excluded is unfounded.

13. The mandatory use of PFPS as a moving map display for operations in the Middle-East is an US DoD operational requirement to assist with battle space de-confliction between blue forces. As the response for Comment 1 indicates, the USAF may have made an operational capability / safety tradeoff in determining this requirement of which the ADF has not had visibility. The chapter defines design requirements commensurate with the safety impact of various types and classes of EFBs. A process has been defined for managing deficiencies against the requirements recommended by the chapter (paras 42, 43). This process provides the Operational Airworthiness Authority the flexibility to use systems where the improvement in operational safety or capability is assessed to be worth retaining the residual risk.

**Disposition**

14. The proposed AAP 7001.054 chapter has been amended to include the following additional clarification to address the comment regarding the Windows OS.

Para 28 - "Type A and B applications are typically hosted on a COTS operating system, such as Windows XP, Mac OS X, Linux, Solaris, etc."

15. The proposed AAP7001.054 chapter on Electronic Flight Bags does not require amendment to address the comment regarding PFPS, as a process for making this type of operational capability / safety tradeoff has been defined.

**Comment 3 – Use of EFBs for Supplemental Information**

16. The comments received are as follows:

*Generally, the chapter makes no allowance for Electronic Knee Pads (EKP) used as a supplementary source of information. For 'non-primary' source applications the EKP should meet technical req'ts such as mounting, HMI, egress, electrical interface, data BUS interface req'ts EMI/EMC. Approval for applications used on these "non-primary" devices should be left to operational airworthiness determinations and not require technical certification.*

*There needs to be flexibility for operational airworthiness acceptance of uncertified applications that are non-primary source.*

**Response**

17. These comments assume that the failure modes associated with 'non-primary' or supplemental source information are minor. There are two limitations to this assessment.

18. Firstly, the failure mode classification relating to any source of navigation information (primary or supplemental) for misleading and/or malfunction without warning is more severe than the failure mode classification for loss of the system. For navigation systems, misleading information from any source (primary or supplemental) in certain phases of flight and flight conditions is considered at least a major failure (IAW FAA AC23.1309/AC25.1309). Airborne systems that have the potential to exhibit major (or higher) failure conditions should be adequately assured and require technical certification.

19. Secondly, F-111 EKP provides displays for navigation that are far more information rich than existing aircraft systems. Thus, despite operational controls, there may be a greater tendency for the EKP to be used in more challenging ways than it is intended, particularly in non-benign flight conditions (e.g. IMC). Furthermore, the display differences between the EKP and the existing aircraft systems are unlikely to facilitate a straightforward cross check between the primary and supplemental information unless this has been designed into the EKP application.

20. On the basis of the identified limitations to the comment's assertion about supplemental source information, DGTA strongly disputes that these devices don't require some degree of technical certification, and can simply be left to operators for acceptance. A process has been defined for managing deficiencies against the requirements recommended by the chapter (paras 42, 43). This process provides the Operational Airworthiness Authority the flexibility to use systems as a supplemental source where the improvement in operational safety or capability is assessed to be worth retaining the residual risk. Therefore, the proposed chapter does not require amendment to define separate requirements for EFBs used for supplemental information.

**Disposition**

21. The proposed AAP7001.054 chapter on Electronic Flight Bags does not require amendment to address these comments.

**Comment 4 – Software Assurance for Type B Applications**

22. The comment received is as follows:

*There also appears to be a major discrepancy between DGTA and FAA regarding Type B Applications:*

*FAA 120-76A: "Type B Application Software does not require compliance with RTCA/DO178B" (para 8.e.1.a)*

*DGTA -054: "... Type B applications .... typically require assurance commensurate to DO-178B Level D" (para 15a). Note that the examples given for Type B are the same across both documents.*

**Response**

23. While it is acknowledged that FAA AC120-76A does not require compliance with RTCA/DO-178B for Type B applications, it is still appropriate for DGTA to define a software assurance benchmark for Type B applications being developed specifically for the ADF. This is because the requirements of AAP7001.054 are often used as a basis for contracting. Where an EFB application is contracted to be developed specifically for the ADF, it is appropriate to define a software assurance benchmark to assist with assessing tenders and for managing the quality of contractor software development activities. Level D simply requires a planned software development process that documents software requirements and provides an appropriate degree of rigor in the verification of these requirements. It is not intended to be a burdensome process for diligent software developers, and in some respects it is inherent in the FAA approach for COTS OS, and COTS OS applications. For COTS software or previously developed applications, verification program guidance has been documented (para 15a) to facilitate acceptance of these applications that is commensurate with the FAA framework.

24. Therefore, DGTA assesses that the question raised by these comments is already addressed by the proposed chapter, and is commensurate with in the intent of the FAA guidance. Further clarification in the draft chapter is not required.

**Disposition**

25. The proposed AAP7001.054 chapter on Electronic Flight Bags does not require amendment to address these comments.

**Comment 5 – Software Assurance for Type C applications**

26. The comments received are as follows:

*Para 16a. SCI should confirm if there are specific robustness criteria applicable to the verification activity for Type C software applications, or is the only requirement to call out full compliance with the applicable DO-178B objectives.*

*Our issue is with Type C certification. The NPRM provides little opportunity, nor allows for the AEO/SPO to engage the operators with a view to accept the extant limitations of DO-178B and COTS applications (including Type A and B co-hosted with Type C applications). To satisfy the NPRM would require significant work with little gain (how do you certify Falcon View to DO-178B).*

**Response**

27. Type C applications carry out functions that are normally carried out by flight displays or aircraft instruments, irrespective of whether they are used as supplemental information or primary displays (refer para 16). On this basis, they require assurance commensurate with other aircraft systems of this type (refer paras 12, 16a). RTCA/DO-178B Levels C through A define an acceptable benchmark for the assurance for these systems, depending on the results of the system safety assessment.

28. The robustness criteria application to the verification of Type C applications is presented in RTCA/DO-178B, and are addressed as part of a normal RTCA/DO-178B development. Note though that Type C applications should not be retrospectively assured and should be developed to a recognised software assurance such as RTCA/DO-178B. Refer to AAP7001.054 Section 2 Chapter 7 for requirements for software safety and assurance.

29. It is highly unlikely that Falcon View could be certified to software levels A, B or C in RTCA/DO-178B. The use of Falcon View should therefore be constrained to only those application types (Type A and B) for which it may be possible to successfully verify the application against (refer paras 14 and 15).

30. A process has been defined for managing deficiencies against the requirements recommended by the chapter (paras 42, 43). This process provides the Operational Airworthiness Authority the flexibility to use systems where the improvement in operational safety or capability is assessed to be worth retaining the residual risk.

31. Therefore, DGTA assesses that the questions raised by these comments are already addressed by the proposed chapter.

**Disposition**

32. The proposed AAP7001.054 chapter on Electronic Flight Bags does not require amendment to address these comments.

**Comment 6 – EMI/EMC Assessment**

33. The comment received is as follows:

*Para 23. Discusses the adequacy of source-victim testing of the EFB hardware within the aircraft cockpit. SCI should confirm if this discussion is implying a different EMI/EMC assessment approach for EFBs from that applicable to any other cockpit equipment with the potential for radiated/conducted emissions.*

**Response**

34. Para 23 provides guidance on considerations for EMI/EMC qualification of Portable EFBs. However, as commented, it does not describe the requirements for Integrated EFBs. Para 12 already states that “Integrated EFB hardware is an installed aircraft system and requires design approval and design acceptance as per any other flight display or aircraft instrument. The EFB hardware must therefore meet relevant aircraft standards, and be designed and built to a level of integrity commensurate with the system safety assessment.” This implies that the EMI/EMC assessment approach for integrated EFBs is no different to that used for any other integrated aircraft system, and is described by AAP7001.054 Section 2 Chapter 2.

**Disposition**

35. The following additional sentence has been added to para 23 to provide clarification.

“Integrated EFBs are installed aircraft systems and should therefore meet relevant aircraft equipment environmental and qualification standards.”

**Comment 7 – COTS OS**

36. The comment received is as follows:

*Para28/29. In the section on COTS Operating Systems, it is stated that addressing CAST 14 requirements is applicable to Portable EFBs with hosted Type C applications, and advised for Portable EFBs with hosted applications other than Type C. Given the statement in para 28 that addressing CAST 14 requirements is a significant task, is it intended that SCI guidance should be sought by SPOs as to whether to expend the resources to address CAST 14 requirements in the case of a Portable EFB with Type B application.*

**Response**

37. Para 29 states that CAST 14 requirements are also advised for Portable EFBs that do not host Type C applications. While not a mandatory requirement, this guidance was included as many of the criteria specified in CAST 14 constitute 'good' housekeeping of a COTS OS (e.g. management of updates, viruses, device drivers, etc). These criteria should be addressed for EFBs hosting all types of applications. A DGTA paper on the use of COTS operation systems is currently in draft and when released will provide further guidance on the assessment process.

**Disposition**

38. The proposed AAP7001.054 chapter on Electronic Flight Bags does not require amendment to address this comment. A DGTA paper on the use of COTS operation systems is currently in draft and when release will provide further guidance on the assessment process.

**Comment 8 – Paperless Cockpit**

39. The comment received is as follows:

*The F-111 is intending to use a Portable EFB as a situational awareness indication. All primary navigation is completed via the aircraft systems. This new proposal appears to be leading to a non paper cockpit. The F-111 has NO intention of replacing the paper cockpit, given PWD is only a little over two years away.*

**Response**

40. The chapter is applicable to EFBs of all types, including those used as supplemental sources of information in a cockpit with paper references, as well as those used in a paperless cockpit. Para's 39-41 provide additional guidance on the preferred approach to transitioning to a paperless cockpit. Therefore, the comment's suggestion that the scope is constrained to paperless cockpits is unfounded.

**Disposition**

41. The proposed AAP7001.054 chapter on Electronic Flight Bags does not require amendment to address this comment.

**Comment 9 – Aircraft Ownship and Re-centring**

42. The comment received is as follows:

*Para 14 a.b.c. Refers to "without re-centring" as Type B and the "with" re-centring as Type C. This.*

**Response**

43. This comment is incomplete, and has unable to be clarified with the originator at this time despite numerous attempts to contact the originator. The originator is referred to the Publication Improvement Report and Reply (PIRR) process once the chapter is published to re-raise a complete comment.

**Disposition**

44. The proposed AAP7001.054 chapter on Electronic Flight Bags does not require amendment to address this comment.

**Comment 10 – Airworthiness Categorisation of EFB Systems**

45. The comment received is as follows:

*Para 10. Suggest rewording of para 10 as follows: Airworthiness Categorisation of EFB Systems. Integrated EFBs form part of the aircraft's Type Design and are managed under the AMTC and Service Release. Portable EFBs that are installed in the aircraft during operation may also form part of the Type Design. Other Portable EFBs are an Aviation Support Systems (ASS) under MILAVREG 6. MILAVREG 6 requires an EFB to be classified by the OAA as one of three categories: Category A, Category B or Category C; based upon the level of risk that failure of the EFB has on safety of flight. AAP 7001.048 Section 2 Chapter 6 provides more detail on airworthiness classification considerations applicable to Portable EFBs.*

**Response**

46. The comment suggests rewording para 10 to discuss integrated and portable EFBs from the MILAVREG Aviation Support System perspective, and to remove some portable EFBs from the scope of the chapter. The comment also removes the description of the relationship between the ADF categorisation and the FAA categorisation.

47. The proposed chapter defines a framework for assessing and determining applicable design requirements for EFBs commensurate with their safety impact. The proposed chapter is intended to apply to all integrated and portable EFBs irrespective of their classification under AAP 7001.048. In this role, the proposed chapter is complementary to the Aviation Support Systems categorisation in AAP7001.048, and may be used to assist in informing the categorising of EFBs under the MILAVREGs.

48. Furthermore, DGTA as the Technical Regulatory Authority (TRA) for assuring the technical integrity of air materiel, is accountable for ensuring that required standards are defined and that appropriate management systems are in place. The proposed chapter defines the required standards and management obligations for EFBs for ADF aircraft.

49. On the basis that the proposed chapter is complementary to the MILAVREGs and is intended to apply to all EFBs; and, as the TRA for air materiel, DGTA is accountable for defining appropriate standards and management systems; the scope of the proposed chapter shall not be changed, as suggested by the comments suggested rewording. Furthermore, the relationship between the ADF and FAA categorisations is fundamental to an understanding of ADF requirements, and should be retained.

**Disposition**

50. The proposed AAP7001.054 chapter on Electronic Flight Bags does not require amendment to address this comment.

**Comment 11 – FEG/WG Involvement**

51. The comment received is as follows:

*Para 11n, 14c, 15c, 19 and 30. Change reference to 'FEG/WG approval' to 'OAA approval'. Reason: The factors under consideration are operational airworthiness issues which are the responsibility of the OAA. While an OAA may delegate his or her authority to an OAAAR or OAAAR(Acq) under the OAREGs, the OAA remains responsible and only the OAA need be mentioned in the AAP 7001.054.*

**Response**

52. The references to FEG/WG in the proposed chapter outline activities associated with the management of EFBs. While these activities will relate to responsibilities of the OAA or OAAARs where delegated, the organisations that should conduct these activities are the FEG/WGs. For this reason, FEG/WG has been used throughout the chapter.

53. Furthermore, paras 42 and 43 provides a process for managing deficiencies against the requirements of this chapter. The OAA is explicit mentioned in this regard, with the process providing the OAA the flexibility to use systems where the improvement in operational safety or capability is assessed to be worth retaining the residual risk.

**Disposition**

54. The proposed AAP7001.054 chapter on Electronic Flight Bags does not require amendment to address this comment.

**Comment 12 – Mission Planning Systems**

55. The comment received is as follows:

*Para 15e. This para makes reference to AAP 7001.054 sect 2 chap 23, which appears to not exist. Should this be reference to another draft chapter for AAP 7001.054 regarding guidance for mission planning systems?*

**Response**

56. AAP7001.054 Section 2 Chapter 23 is presently in draft and will be released via the NRPM process for comment in the coming months. As this chapter is intended to be released in the near term, DGTA has elected to include reference to it in the chapter on Electronic Flight Bags.

**Disposition**

57. The proposed AAP7001.054 chapter on Electronic Flight Bags does not require amendment to address this comment.

**Comment 13 – Environmental Conditions**

58. The comment received is as follows:

*Para 23. Environmental conditions need to be assessed in addition to hazards. Elements particularly appropriate to ADF operations relate to readability in low light, extremes of light conditions (bright sunlight/night ops; cockpit normal and or red/blue lighting) and NVG compatibility. There are Standards governing the colours, symbology etc for paper products and these should be reviewed for standardisation and applicability to e-document products.*

**Response**

59. The comment suggests adding environmental conditions, including NVGs, and symbology guidance to the paragraph on equipment qualification.

60. Environment conditions and NVGs are not well associated with equipment qualification, and should be addressed by human factors aspects of the guidance. Paras 25-27 detail the requirements for human machine interface, which includes considerations for environmental conditions. As referenced (para 25), AAP7001.054 Section 2 Chapter 13 and AC 120-76A provide further information on assessment approaches and human factors design and operational considerations that include environmental conditions, NVGs, and symbology. Therefore, the comment is already addressed by the proposed chapter.

**Disposition**

61. The proposed AAP7001.054 chapter on Electronic Flight Bags does not require amendment to address this comment.

**Comment 14 – Additional Safety Considerations**

62. The comment received is as follows:

*Para 33. Add new sentence at the end of the paragraph: The requirement for redundancy/back-up systems should be determined by the system safety analysis.*

**Response**

63. Para 33 is about recognising the safety assumptions made throughout the extant system safety program. Para 41 identifies SPO considerations for redundancy/back-up systems in transitioning to a paperless cockpit, and therefore already addresses the intent of this comment.

**Disposition**

64. The proposed AAP7001.054 chapter on Electronic Flight Bags does not require amendment to address this comment.

**Comment 15 – Operational Considerations**

65. The comment received is as follows:

*Paras 36–40. These paragraphs are operational airworthiness guidance that will eventually be moved to AAP 8000.010 and rationalised against the content required to be retained in AAP 7001.054. ACPA–ADF accepts that these paragraphs can be published in AAP 7001.054 until it can be incorporated into AAP 8000.010.*

**Response**

66. Operational considerations have been included to identify the relationships to technical issues and the safety assessment, as well to address a current absence of such guidance in operational publications. The scope and relevance of the inclusion of the operational considerations presented in the proposed chapter will be reviewed when the operational publication's content on EFBs matures.

**Disposition**

67. The proposed AAP7001.054 chapter on Electronic Flight Bags does not require amendment to address this comment. Review of the operational considerations will occur when operational publication content on EFBs matures.

**Comment 16 – Operational Evaluation**

68. The comment received is as follows:

*Para 40. Reword paragraph as follows: Operational Evaluation. A minimum 6 month operational evaluation period is recommended when transitioning to a paperless cockpit before final approval to reduce or eliminate paper copies in the cockpit. During this period, an EFB system must demonstrate that the information it displays or produces is as available, accurate, accessible and as complete as that provided by the paper system. Procedures to cover an occurrence of loss of EFB functions in all failure scenarios and phases of flight should also be developed. Mitigations should be provided against complete loss of functions provided by EFB systems (eg a complete set of paper documents could be stored in the cockpit, or carried by selected crew members). Occurrences relating to the use of the EFB within the scope of SAFETYMAN vol 3 part 1 should be reported by ASOR. For other occurrences during the evaluation a reporting system to record issues the EFB presents should be introduced. ASORs and other issues recorded provide a sound basis for policy review during the evaluation period and ultimately operational approval.*

**Response**

69. The suggested rewording of para 40 includes additional information relating to the raising of ASORs, other means of operational reporting, and requirements for policy review. It also includes some grammatical variation of sentences in this paragraph.

70. The suggested rewording of para 40 has not been adopted as the additional information describes processes that are already defined in other publications (i.e. ASOR process) that are not within the scope of the focus of the paragraph. The focus of the paragraph is to describe the required outcome for a successful operational evaluation, and the procedures and mitigations associated with managing hazards with the operational evaluation. Furthermore, existing processes already exist for review of AAP7001.054 policy. Therefore, this additional information has not been adopted.

71. DGTA has also assessed that the grammatical variation adds no additional value to the paragraph, and has not been adopted.

**Disposition**

72. The proposed AAP7001.054 chapter on Electronic Flight Bags does not require amendment to address this comment.

**Comments Miscellaneous – Edit Comments**

73. Several minor typos and edit comments were provided. These comments have resulted in minor revisions to the proposed chapter where assessed as relevant.

**DGTA-ADF POSITION****Publication Changes**

74. The comments received on the NPRM 01-08 were useful and many have resulted in minor improvements to the new AAP7001.054 chapter on electronic flight bags. These improvements are described in the 'DGTA Response' sections presented in this document. The proposed AAP7001.054 chapter on Electronic Flight Bags has been reviewed and authorised, and will be released through the publication amendment process.



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7 Aug  
July 2008

**Annex:**

A. List of Respondents

**NOTICE OF PROPOSED RULE MAKING NPRM DGTA 01-08**

**LIST OF RESPONDENTS**

GPCAPT R. Ambler	HQAC
CMDR S Lockey	NASPO
SQNLDR B. Nunan	HQACG
SQNLDR G. Cain	SRSPO
SQNLDR C. O'Neil	ACPA-ADF